Joint Chemical Agent Detector (JCAD)

The Joint Chemical Agent Detector (JCAD) is a hand-held device that is intended to automatically detect, identify, quantify, and warn users of the presence of nerve, blister, and blood chemical agents. JCAD will be mounted on a vehicle, aircraft, or fastened to the operator's load bearing equipment. JCAD will be used for on-station monitoring at designated locations and employed as a survey instrument aboard ships. The system is intended to operate as a stand-alone detector, as part of a small local network of other JCAD units, or interface with the Joint Warning and Reporting Network as part of a larger network of biological and chemical detectors.

JCAD's hardware consists of the main Detector Unit (DU); a pre-concentrator accessory for extending the lower detection limit of the DU; and an interface cradle that includes a mount and connections to interface the DU with external power, external alarms, and other DUs to form a local detection network. One detector configuration is planned for use by all of the Services. JCAD will replace or augment existing Service-unique chemical agent detectors.

A combined Milestone I/II decision was made in December 1997 that allowed JCAD to enter into Engineering and Manufacturing Development (EMD). Phase I of the EMD contract was awarded to BAE Systems in February 1998 and the Phase II contact option was exercised in April 1999. JCAD was placed under DOT&E oversight in January 2000.

The Air Force is JCAD's lead materiel developer, while the Army is the lead developmental and operational evaluator.

TEST & EVALUATION ACTIVITY

In January 2002, the contractor conducted a government-witnessed blind test of the agent detection algorithm as part of the chemical surety testing. Overall, the detector successfully completed its Critical Design Review 3 in February 2002. The contractor has been conducting government witnessed Military Standard 810 testing as part of Contractor Verification Testing.

The Operational Requirements Document was updated and approved as of March 2002. The program office re-baselined the program in June 2002 to account for funding changes. The current program baseline calls for Milestone C in September 2003 and Initial Operational Test and Evaluation beginning in FY04. The Test and Evaluation Master Plan is currently in staffing.

TEST & EVALUATION ASSESSMENT

JCAD failed a series of chamber tests including: high and low temperature operations, high humidity, solar radiation, and blowing rain environment. A retest is scheduled in 2003. The electromagnetic interference test indicates some redesign of the case is required. The system entered Production Qualification Testing (PQT) in FY03.

The live agent algorithm tests indicated the detector has difficulty detecting a certain agent, particularly at low concentrations. The operational risk is low, however, because this agent is difficult to use as a weapon, highly volatile, and not widely used as a chemical agent. The system is experiencing problems in detecting at the extremely low (miosis) levels of concentration. This issue must be corrected if JCAD is to be operationally effective in aircraft.

The PQT plan provides a robust set of agent and interferant challenges to the detector, including weapon grade agent testing. In all, there are over 9,000 separate challenges throughout the PQT.

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Agent-simulant correlation testing is ongoing at Aberdeen Proving Ground. So far, testing has identified one simulant that will cause the detector to alert. The simulant, Triethyl Phosphate, is considered unsuitable because of its damaging effects on paint and plastics. A final decision regarding its use will be made in 2003. However, there will be at least one agent simulant available for operational testing. The PQT described above will provide the only data to assess JCAD's performance against live agents.